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THE WEATHER OF 1947 IN THE UNITED STATES

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The dependence of agriculture upon the vagaries of the weather was clearly demonstrated in the effect of weather sequences upon the 1947 corn and wheat crops. Cool, wet weather in the Wheat Belt during early spring, followed by drier weather with plenty of sunshine in May and June, was ideal for the greatest total production and highest yielding wheat crop in the history of the Great Plains. On the other hand, the cool, wet weather in the Corn Belt during spring months, preventing soil preparation and planting, continued well into summer, when excessive rains and record floods considerably reduced the planned acreage. Another blow was delivered to the corn crop by a heat wave which prevailed in the Central areas from the latter part of July until the middle of September. Although a late fall in the Midwest was favorable to allowing much late corn to mature, production was cut to some extent by early frost in Ohio and portions of the Lake States. Lack of rain in the Southwest and southern Great Plains during the autumn delayed seeding of a great portion of the winter wheat crop and prevented normal growth, with the result that the wheat was in poor condition to go through the winter. Generally, however, the autumn season was warm and dry and especially favorable for harvesting. Significant of mention in the early part of the year also was the cold wave which struck Florida in February, damaging truck and citrus crops severely.

The year 1947 was notable, too, for the record property losses resulting from severe storms. Hurricane losses totaled about $135,000,000, more than 13 times those of 1946, and 53 lives were lost. Total tornado losses of nearly $24,000,000 were approximately double those of 1946; and the loss of life, numbering 306, was about 4 times that of 1946. (See articles on hurricanes and tornadoes elsewhere in this issue and tables of "Severe Local Storms" in each issue of this publication for 1947.)

Temperatures.—The mean temperature for the year, derived by weighting the average temperatures of the different States according to their areas, was slightly above the average for the period 1886 to 1947. Temperatures averaged about normal for the year over most of the country, ranging from somewhat above normal in Florida and New England to considerably above in the extreme Northwest, and registering somewhat below in large areas of the Ohio Valley and South-Central States. Annual averages were as much as 2 to 4 degrees above normal in western Washington and northern Oregon. For the year's highest temperature, Cow Creek, Calif., recorded 126° F., on July 19, a figure 8° below the all-time high. The lowest temperature of —43° F. was recorded at Gavilan, N. Mex. (7,350 feet elevation), on January 16, a reading 23° above the all-time low.

An interesting pattern is presented by the variation of 1947 temperatures from the normal. In January they averaged above normal in the East, below in the West, although the reverse was true for February through May, inclusive. June temperatures averaged above normal for the southern one-third of the country and below normal for the northern two-thirds. Geographic distribution changed in July, with the western two-thirds of the country experiencing above-normal heating while the eastern one-third average was below normal. For the next 3 months averages were generally above normal, dropping to below in November and rising again to above normal in December.

Table 1 shows the monthly and annual State temperature departures, and their areal distribution is shown by the annual temperature departure chart following this article.

Precipitation.—The average annual precipitation for the country as a whole, based on weighted averages, was 28.78 inches, 0.39 inch less than the average for the period 1886 to 1947, or very near the normal. Figure 1 gives the percentages of normal precipitation by States for 1947; Figure 2, the percentages for the growing season; Table 2, the percentages by month and for the year; and Table 3, the monthly and annual amounts. The areal distribution of the percentages of normal is presented by the chart following this article. It shows a rather broad belt of above-normal precipitation extending from New England westward to the central Rockies, thence north-

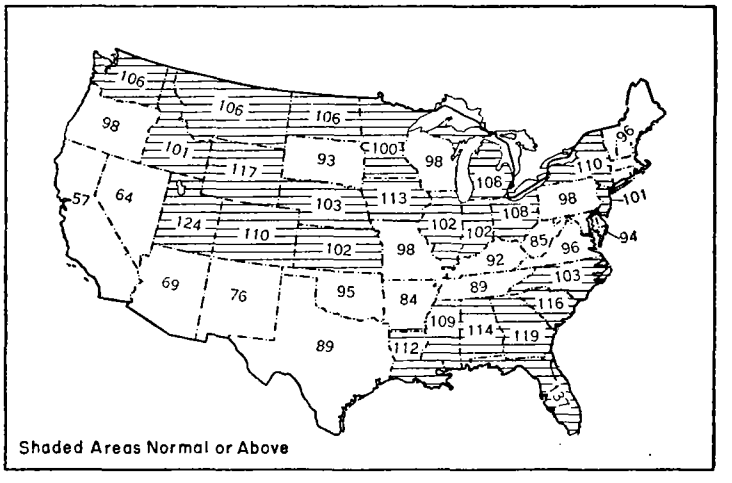

FIGURE 1.—Percentage of normal precipitation, 1947

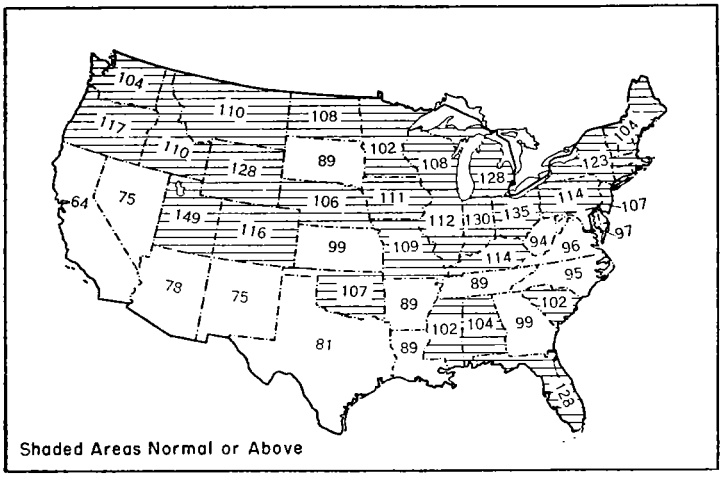

FIGURE 2.—Percentage of normal precipitation, April 1–September 30, 1947

westward through western Montana, northern Idaho, and northern Washington. Another belt of above-normal amounts included the coastal areas from eastern Texas to central Virginia. Precipitation was only one-fourth to three-fourths of normal in California, Nevada, Arizona, and New Mexico.

January.—January was generally warmer than usual, although temperatures were near or below normal in the Far West, including Idaho, southwestern Wyoming, western Colorado, New Mexico, and all of Texas, except the northern portion. Relatively warmest were the North-Central States, where temperatures averaged 6° to 12° above normal. During the first week of the month temperatures ranged above 3° warmer than usual in the Dakotas, while in Texas they averaged from 18° to 21° colder than usual. The second and fourth weeks were warm, especially the fourth week, when practically the entire country enjoyed unseasonably warm weather, with temperatures in South Dakota averaging 24° above normal.

Total precipitation was heavy over the eastern one-third of the country and in south-central Texas, Iowa, and eastern Nebraska, and more than twice the usual amounts occurred in sections of Tennessee, Alabama, and Mississippi. Elsewhere totals were below normal, especially in the Florida Peninsula, Missouri, western Arkansas, Oklahoma, and the upper Mississippi Valley, and in the Far West where many stations received less than one-half the usual amounts. Precipitation in most of northwestern New Mexico, Arizona, the southern portion of the Great Basin, and central and southern California was less than one-fourth of normal.

The coldest weather of the month in the North-Central States occurred during the beginning and closing days. During the first period new, all-time low-temperature records were established at many stations in northeastern Kansas, and January low-temperature records were broken at a large number of stations in the southeastern part of the State. Freezing rain covered Indiana and northwestern Ohio with ice, resulting in considerable damage. The low temperatures at the end of the month followed a severe storm which moved from Colorado to the Lake region during January 29–31. In the northern sector of this storm there were heavy snows, freezing rain, sleet, and widespread thunderstorms. Winds of gale force piled the heavy snow into high drifts, virtually isolating many cities in southern Wisconsin, northern Iowa, and Illinois. A belt of sleet and freezing rain extended from extreme southern Iowa through the Chicago area into extreme southern Michigan, with freezing rain extending into Ohio and New York. In the southern sector of the storm violent thunderstorms and tornadoes were reported from Missouri, Arkansas, Tennessee, Georgia, Alabama, and Ohio. A series of destructive tornadoes occurred in northeastern Missouri on the 29th, and a heavy dust storm and damaging winds occurred in Oklahoma on that date. Southerly winds along the Atlantic, induced by this Midwestern storm, brought unseasonably high temperatures as far north as New England. The high afternoon temperature in Washington, D. C., was 73° F., on January 30, a record for that date.

February.—This month was considerably colder than usual east of the Rocky Mountains, except eastern Montana, the Dakotas, northwestern Minnesota, northern Michigan, and much of New England, while mild weather generally prevailed in the Rocky Mountain and Pacific States. Average temperatures for the month ranged from 6° to 8° below normal in portions of West Virginia, Kentucky, Tennessee, and Mississippi, to 6° above normal in the Great Basin of the Far West.

An unusual southward movement of cold polar air on the 5th and 6th brought below-freezing temperatures to the entire mainland of Florida. Low temperatures in the Everglades ranged from 25° F. to 30° F., remaining below freezing from 4 to 8 hours. Truck and citrus suffered heavily, and monetary losses were estimated at $50,000,000. Although no absolute minimum temperatures were broken, this was the coldest February in Florida since 1895.

This month was much drier than usual. Principal exceptions were most of Florida and Maine, extreme northern Michigan, and a narrow belt extending from west-central Montana along the Continental Divide to southern Colorado. Generally less than one-fourth of the usual amount of precipitation was received in South Carolina; most of Georgia; and a large area extending from the southern Lake region and lower Ohio Valley southwestward across the southern Great Plains into Texas, southern New Mexico, and southern Arizona. It was the driest February of record in Wisconsin, Illinois, Indiana, Ohio, Missouri, Kentucky, Oklahoma, and Mississippi, and the second driest of record in Arkansas and the Carolinas. In South Carolina the dry weather with high winds was responsible for 1,900 forest fires which burned approximately 100,000 acres of forest land.

February snowfall was below normal in Wisconsin; the States south of Tennessee and North Carolina; all States west of the Mississippi; and especially in the Pacific States. All the remaining States received more than the usual amounts, some more than twice the normal. Total snowfall in West Virginia was the greatest of record for February, mostly occurring on the 20th and 21st. The wind caused much drifting in this State, and Canaan Valley reported drifts from 15 to 50 feet in depth.

There was a severe blizzard on the 6th, 7th, and 8th in northwestern North Dakota. The wind blew drifts 12 to 15 feet deep which blocked highways and branch railroads. Numerous dust storms in the Great Plains during the first week of the month caused some soil erosion and in some cases reduced visibility to one-fourth mile, but no serious damage resulted.

March.—In contrast to the March weather of 1945 and 1946, this month in 1947 was generally cold east of the Continental Divide, although eastern New York, New England, and the extreme northern portion of the North-Central States were normal to slightly above in tempera-

ture. Virginia and West Virginia had the coldest March of record; Louisiana, Mississippi, and North Carolina had the second coldest of record; and new low-temperature records were set in eastern Kentucky on the 28th. Killing frosts occurred in Georgia as late as the 29th.

Precipitation was slightly above normal in portions of the Northeast and Northwest, in the southern Great Plains, Georgia, South Carolina, and the Gulf States, but was near or slightly below normal elsewhere in the country.

There were three significant cold waves east of the Rockies during the month. At the beginning of the month the first one brought freezing temperatures to the Gulf of Mexico. Low temperatures in Mississippi ranged from 16° F. to 28° F. This cold wave was preceded by a severe snowstorm in the Middle Atlantic and New England States, and much of the above-normal March snowfall which these States received fell during this storm. Many roads were blocked in Pennsylvania, and 25 inches of snow fell at Pleasant Mount on the 2d and 3d. In New York total snowfall for the storm ranged from 1 foot to 4 feet; severe drifting resulted in blocked roads, damaged power lines, isolation of communities, and closing of schools. At Readsboro, Vt., 50 inches of snow fell during this storm, and 47 inches fell at Peru, Mass.

The second cold wave occurred east of the Rockies about the middle of the month, following a storm attended by heavy rains in central Gulf States and in the eastern portion of the central and southern Great Plains. A series of tornadoes, hailstorms, and windstorms occurred in Louisiana on the 12th, which caused heavy damage and the loss of two lives.

The third cold wave followed a severe storm in the Northeastern States on the 25th and 26th. Freezing rain, sleet, and heavy snow damaged service lines and impeded traffic in Illinois. Snow drifts blocked roads and isolated communities for days in southern and eastern Michigan and hampered transportation in New York. Bus service was suspended and schools closed in northeastern Ohio, where 10 to 12 inches of snow fell. Severe winds which accompanied this storm caused millions of dollars worth of damage, principally in Pennsylvania; winds of 90 m. p. h. were recorded at Pittsburgh, Pa., and winds of 70 m. p. h. or more were reported from North Carolina and West Virginia. Snowfall was also heavy in other sections, Virginia and West Virginia recording the heaviest average March snowfall of record.

April.—Temperatures averaged somewhat cooler than normal in New England, the Lake region, the Great Plains, and in much of the central and northern Rocky Mountain region, while the country was warmer than average elsewhere. In the Great Valley of California high temperature records were broken or equaled at several stations.

Precipitation was heavy over the eastern half of the country, including the central Great Plains but excluding much of New England, Tennessee, North Carolina, Virginia, and West Virginia. A few sections of Nevada, Utah, Wyoming, Montana, and eastern Washington also reported above-normal amounts. More than twice the usual precipitation fell at many stations in a belt extending from Kansas and Nebraska to southern Michigan as well as in the east-central Gulf Coast region; less than half the usual amount fell in most of California, Arizona, New Mexico, and much of Texas. It was the second wettest April of record in Indiana, Iowa, and Oklahoma, and the third wettest in Michigan. This cool, wet weather seriously delayed farming operations in many northeastern and central States from 2 to 3 weeks. Arizona, however, received only about 6 percent of the normal moisture.

Damaging floods occurred from Missouri and Illinois to western New York and Pennsylvania. In southern Michigan floods and heavy precipitation during the first week caused an estimated $4,000,000 damage.

Hail, windstorms, and tornadoes caused damage estimated at over $12,000,000. Most of this loss was due to the unusually destructive tornado that killed 167 persons as it passed from White Deer, Tex., through Woodward, Okla., to St. Leo, Kans., destroying property to the extent of nearly $10,000,000.

May.—May was cooler than usual from the Western Plains eastward almost to the Atlantic Coast, with temperatures averaging about 2° to 6° below normal in the North-Central States. On the other hand, it was considerably warmer than usual in the Rocky Mountain and Pacific States, with temperatures averaging 6° or more above normal in the central portion of this area. During the first few days of the month temperatures were extremely high in the far Southwest. Maximum records for so late in the season were broken throughout the State of Arizona: the Flagstaff high temperature on the 3d was 14° above the previous high for that date, and temperatures at 24 stations exceeded 110° F. In Nevada, Idaho, New Mexico, and Utah, many early-season maximum temperature records were set as well. This month was the warmest May of record in Washington, and the second warmest in the Great Valley of California.

During the second week of the month a cold air mass overspread the eastern United States, bringing freezing temperatures as far south as Tennessee and southern Virginia. Widespread frosts caused considerable damage in the Ohio Valley, Maryland and Virginia, and some damage in Tennessee and the Carolinas. A new low May temperature average of 16° F. was recorded in Pennsylvania.

May was drier than usual in southern Virginia, North Carolina, along the south Atlantic coast, and in an extensive area from the upper Mississippi Valley westward over the Northwestern and Pacific States; elsewhere amounts were generally above normal. Less than half of the usual precipitation fell in the Florida Peninsula and in the area from the Dakotas to the North Pacific States generally, while totals were twice the normal in sections of New York, Pennsylvania, New Jersey, southern Utah, southern Arizona, southern New Mexico, and along the north Texas coast.

It was the wettest May of record in New York, where damaging floods occurred. The cool, wet weather in the North-Central, Middle-Atlantic, and New England States further delayed farm work and caused slow growth of vegetation. Heavy snowfall in Nebraska and Wisconsin on the 28th and 29th set new May records. Depths were as great as 12 inches in western Nebraska and 4 to 8 inches in central Wisconsin. An average total snowfall of 1.1 inches in Iowa was a May record for that State. Winds on the 8th and 10th in the Great Valley of California caused an estimated damage of $1,000,000 to crops. Floods in Oklahoma caused losses estimated by the State Highway Commission at $1,000,000. Five tornadoes in this State damaged property to an estimated extent of $1,260,000. One of these in its approach to Leedy, Okla., was closely watched for 30 minutes, and although property damage was about $1,000,000 in a community of 600, only 6 lives were lost and 15 persons injured.

June.—This month was unseasonably wet and cool in the northern two-thirds of the country and rather warm and dry in the southern one-third, except that temperatures averaged somewhat below normal in Alabama and Georgia. Temperatures in the central Rockies during the last two-thirds of the month, and in the North-Central States during the third and fourth weeks were much below normal.

Precipitation followed much the same geographical pattern as the temperature, with above-normal amounts falling in the northern two-thirds of the country and near- or below-normal amounts in the southern one-third. More than twice the normal amounts fell in Iowa, Nebraska, Wyoming, Utah, and the Pacific States. It was the wettest June of record in South Dakota, Nebraska, central Illinois, and northern Missouri, and the average rainfall in Iowa exceeded the previous record by more than 2 inches. In the extreme Southwest accumulated deficiencies of rainfall reached the drought stage, and water supplies were critically short in some localities.

On the 19th a thunderstorm of cloudburst proportions occurred at Lake Charles, La., with a total of 15.79 inches of rain falling in about 8½ hours: 15.38 inches fell between 6:00 a. m. and 12:00 noon, the greatest 6-hour amount ever recorded in an automatic gage anywhere in the United States.

June was outstanding for the severe and prolonged floods which followed the heavy, and in some cases unprecedented, rain which fell in the lower North-Central States. Floods in the central Mississippi and lower Missouri River basins were the worst in more than a century. Damage caused by these floods probably exceeded $100,000,000. Intended acreage of corn was reduced considerably in flooded areas, and wet soil in surrounding areas delayed planting from 2 to 4 weeks.

There were also many destructive storms during June. The first was a tornado which struck near Pine Bluff, Ark., on June 1, killing 35 people, injuring 300, and causing damage estimated at $1,000,000. Heavy rains on the 2d and 3d caused a power dam to collapse at East Pittsford, Vt., resulting in $2,000,000 worth of damage. Hail damage in Kansas totaled nearly $7,000,000, and wind and hail damage in Nebraska was near $3,500,000. A tornado caused three deaths and property damage exceeding $1,000,000 in its passage across Mercer County, Pa., on the 8th. Damage by a hailstorm in the area surrounding the towns of Haxteen, Fleming, and Holyoke, Colo., on the 29th was estimated at $2,000,000.

July.—The month was cooler than normal in the eastern one-third of the country except for New York and New England, in the interior of California, in most of Nevada, and in extreme southwestern Oregon. Elsewhere temperatures were near or above normal. The minus departures were 4° or more in much of the Ohio Valley. Temperatures averaged the lowest of record in the lower Ohio Valley, Tennessee, South Carolina, and Georgia. It was not only the coolest July of record in Kentucky, but low-temperature records of many years' standing were broken in most sections on the 23d, at some western stations by more than 5°. Record-breaking low temperatures were recorded in Tennessee on the same morning.

Precipitation during July was below normal, except in New York, Pennsylvania, New England, Florida, and the Pacific States. Several States west of the Mississippi received less than 50 percent of usual July amounts: Nevada had only 10 percent of normal moisture, with only 20 out of 72 stations in this State reporting measurable precipitation. Drought conditions continued in Arizona, and it was the second driest July in Idaho since 1893. At a number of stations in the Southwest there was no precipitation.

A great many severe local storms occurred during the month, resulting in more than 20 deaths and property damage exceeding $13,000,000. A severe hailstorm on the 3d, with stones ranging in size from marbles to oranges, caused $350,000 damage in Stafford, Pratt, and Kingman Counties, Kans., mostly to wheat ready for harvest. Heavy hail on the 11th damaged small grains in the Lewistown, Mont., area to an estimated extent of $1,000,000. A severe hail and windstorm in Morrill, Box Butte, and Cheyenne Counties, Nebr., on the 21st caused $3,000,000 damage, mostly to the wheat crop. Hail and wind caused $1,000,000 damage in southwestern Iowa on the 12th.

August.—With the exception of Florida, extreme southern Texas, southwest Washington, and most of Nevada and California, temperatures were above normal. It was generally one of the hottest Augusts of record, and the extremely high and prolonged temperatures in the North-Central and South-Central States broke many records. It was not only the hottest August of record in Illinois, but the second hottest of any month in the climatological history of the State, and it equaled the existing record for the amount of sunshine. At La Salle, Ill., these were 13 days when temperature readings were 100° F., or above, and at Springfield and Cairo, Ill., there were 27 days with maximum temperature readings of 90° F. or higher. These readings set new all-time records for any month for those stations. This was also the hottest August of record in Indiana, Michigan, and Ohio. Bismarck, N. Dak., had 6 days with maximum temperatures above 100° F., which was 4 more days than such readings had been recorded for any other August since 1875. In North Dakota there are normally 5 days in August with temperatures above 90° F.; this year there were 11. In South Dakota temperatures above 100° F. occurred on half the days in the month. At a few southern stations in Nebraska there were 20 days with maximum temperatures of 100° F.

Precipitation was below normal over most of the country, with only scattered areas where recorded totals were normal or above. The largest area with above-normal amounts included Utah, Arizona, Montana, and adjacent areas in the Rockies. Much of the Ohio Valley, parts of Florida, and extreme southern Texas also had more than the usual rainfall. A large area, including the Mississippi Valley and extending to the Rocky Mountains, had only about half the usual moisture. The combination of scanty rainfall and high temperatures caused considerable deterioration of crops in the Corn Belt.

There were many damaging hailstorms in Montana during August, where a few unusually destructive ones caused more than $1,000,000 damage each; total hail damage for the State probably exceeded $7,000,000, mostly to small grains. On the 9th a heavy rain in Needles, Calif., and vicinity washed out highways, railroad tracks, and flooded an ice plant, causing damage estimated at $1,000,000.

A tropical disturbance entered Texas in the Port Isabel area on the 1st, causing $2,000,000 damage to the cotton crop, although the additional moisture was beneficial to other crops. On August 24, a small tropical disturbance moved in over Galveston, Tex., where a maximum wind of 70 m. p. h. was recorded at the airport. Total damage done by this storm was about $757,500; of that amount, $500,000 was to property, the remainder to crops.

September.—Temperatures for the month averaged above normal except in North Dakota, northern Minnesota, and the extreme northeastern portion of Montana. Temperatures were more than 3° above normal in the southwestern and much of the central portions of the country. Much warmer than usual weather in the eastern half of the country during the first 3 weeks changed to considerably cooler thereafter, accounting for the lack of extreme departures from normal. This pattern was reversed in large portions of the West, with temperatures remaining below normal until the last week, then rising to much above normal. In the central Great Plains the weather was as hot during the first two weeks as in August. High temperatures of 107° F. and 112° F. were registered in southeastern Nebraska on the 3d. The first 10 days were the hottest of the season in Oklahoma, and the all-time high of 115° F. for the month was equaled at Alva, Okla., on the 3d. Near-record high temperatures occurred generally over Louisiana, and numerous heat records were set in Arkansas.

The distribution of precipitation was extremely erratic. Greater than usual amounts fell in central and southeastern coastal areas, the lower Ohio Valley, a portion of the North-Central States, the Lake region, a considerable portion of the northern Mountain States, and extreme southern California. Heavy rains caused streams in North Carolina to overflow: Raleigh suffered extensive property damage as did Washington and Greenville, on 20th; Greensboro and High Point, on the 24th and 25th, suffered considerable damage to public property, streets, bridges, and dams. This excessive moisture was not the the rule, however, in the Southwest, where many areas received less than one-fourth the usual amounts of precipitation and a few recorded none. These dry conditions delayed the seeding of much wheat and were unfavorable for germination and growth of that previously seeded.

The cool weather in central areas during the latter part of the month caused damaging frosts in a number of sections. The worst was in Ohio where frosts on the 23d and 27th were believed by many competent observers to have caused greater crop damage, especially to corn, than any early frosts for 30 years or more. The loss was augmented greatly by the lateness of the crop, since many fields were still green.

On the 5th and 6th in dry areas of central South Dakota, a prairie fire covering 500 square miles destroyed hay, farm buildings, fences, livestock, and poultry. Total losses were estimated at $2,000,000.

A severe hurricane moved across southern Florida on the 17th and northward across Louisiana on the 19th, accompanied by winds of over 100 m. p. h. Total damage was estimated at $110,000,000. From September 26–30 prolonged northeast winds caused abnormally high tides and heavy surf along the Florida beach from Fernandina to New Smyrna. Sea walls were washed out, and buildings were undermined and collapsed, resulting in damage estimated at about $4,000,000.

October.—With the exception of a small area in northwestern California and extreme southern Florida, October temperatures averaged above normal throughout the country. Highest monthly departures were about 10° in North-Central States. Warm weather persisted throughout the month, with the exception of a few relatively cool days in the Ohio Valley and central and southeastern Coastal States during the first week; in the central Mountain States during the fourth week; and in the Central Valley of California during the second week. During the week of the 14th to the 21st, temperatures averaged 15° to 18° above this week's normal for the North-Central areas. This unusually warm weather in central areas resulted from a combination of incoming warm southerly winds and westerly winds warmed by their descent from the Rockies. Among the many October high-temperature records which were broken was that for Kansas, where a new record was set on the 5th, as 102° F. was recorded at Concordia.

Precipitation was extremely irregular in distribution, although for the country as a whole it was near the normal. Areas with below-normal precipitation included the southern tier of States from Alabama westward through southern California, the central and southern Great Plains, Minnesota, Wisconsin, Michigan, the Ohio Valley, the Middle-Atlantic, and New England States. Less than one-fourth the normal amounts fell in northern New England, much of western Texas, and northern Michigan. The Pacific Northwest, the Central Mountain States, Arkansas, Iowa, Missouri, Illinois, Florida, Georgia, and the Carolinas received normal amounts. Portions of the central Rockies received from two to four times the usual amounts, and it was the wettest October of record in Washington. Much of the heavy precipitation in southeastern areas accompanied the hurricane which struck Chatham County, Ga., on the 15th. Winds were estimated at 100 m. p. h. at Savannah Beach and gusts of 95 m. p. h. were recorded in Savannah. Resultant damage, mostly to buildings and communication lines, was estimated at $2,000,000 for the county, with additional losses to timber, crops, roads, and communication lines in the environs estimated at $250,000. Along the southern South Carolina coast, winds and high tides caused $185,000 damage and one life was lost.

Damaging northeast winds along the Florida coast the last few days of September continued during the first 6 days of October, causing additional damage estimated at $1,000,000. On the 8th, hail caused a total damage of $1,800,000 in Levelland and Hockley Counties, Tex.: $1,000,000 was to buildings, $750,000 to crops, and $50,000 to livestock. On the 26th, wind and hail damage combined caused over $300,000 damage in Jacksonville, Rusk, and Cherokee Counties, Tex.

Serious drought conditions prevailed in New England during October, creating an almost unprecedented fire hazard that culminated in forest and grassland fires from the 21st through the 28th. Damage to forests and property was estimated at $3,000,000 to $5,000,000, and five people lost their lives.

November.—Average temperatures for November were generally 2° to 4° below normal, although they were slightly above normal in northern Michigan and a few scattered coastal areas. Warm weather during the first 3 or 4 days of the month was followed by cold weather, interrupted only by a period of warm weather in the western half of the country the last few days of the month. There were no unusual extremes.

Precipitation was distributed in four rather well-defined belts. The wettest section included the Appalachian Area, the Atlantic Coastal and South-Central States, with much of the Central and Atlantic Coastal areas receiving from two to three times the usual amounts. An adjoining dry belt extended from northern Michigan and the Ohio Valley, where some areas received less than 50 percent of normal amounts, through Missouri, Oklahoma, and central Texas. Another wet belt included most of the North-Central States and the central Rockies, extending into Idaho and eastern Oregon and southward through the Western portion of the Great Plains to the southern border, with precipitation amounts in Idaho and considerable areas in the North-Central States exceeding twice the normal. The remainder of the western portion of the country was very dry, some coastal areas receiving less than one-half their usual precipitation.

Much of the precipitation in northern areas, due to

persistently cold weather, fell as snow. South Dakota received the heaviest total snowfall of record, 15.8 inches, or 11.5 inches more than usual; near-record totals were received in surrounding States. These heavy snowfalls were often accompanied by high winds, with resultant heavy drifting that blocked secondary roads and made main-highway travel difficult. On the 6th and 7th a severe wind-, snow-, and sleet storm in Minnesota blocked roads and did $1,200,000 damage to power and communication lines and other property; one person was killed and two injured. High winds and heavy snow delayed or stopped transportation and damaged power and communication lines severely in the eastern two-thirds of South Dakota on the 14th and 15th.

On the 6th and 7th a tornado struck Galiano, La., killing 3 people, injuring 10, and causing damage estimated at $50,000. Eglin Field, Fla., was struck by a tornado on the 11th which injured 13 soldiers and caused $75,000 damage. On the 12th, winds of near hurricane force, high tides, and heavy rain caused widespread damage in Nantucket, Dukes, and Barnstable Counties, Mass., totaling about $1,000,000. A tornado on the 14th caused $500,000 damage in and near DeRidder, La., and injured 20 persons.

December.—Temperatures averaged below normal in New England, the northern portion of the Middle Atlantic States, portions of the North-Central States and the Great Basin of the Far West; elsewhere they were above normal. The greatest average departures amounted to −4° in extreme northeastern New York and northern Vermont and +6° in northeastern Montana. The first half of the month was somewhat colder than normal, especially the second week, but seasonably warm weather prevailed thereafter, averaging 12° to 15° above normal in portions of the North-Central States.

Precipitation was above normal in the South-Central and Southeastern States and portions of the Midwest. In the southern Great Plains, where drought conditions during the Autumn had delayed seeding and retarded growth of the winter wheat crop, this was especially beneficial. Elsewhere in the country precipitation was below normal, with numerous areas receiving less than half the usual amounts. The last half of the month was unusually dry, with precipitation entirely lacking in large areas of the Southwest. Accumulation of snow in the western mountains was lagging much below normal at the end of the month. Much-above-freezing maximum temperatures melted the snow cover over large areas of the North-Central States, leaving the wheat crop without adequate protection, and delaying the ice harvest which is normally under way during the latter part of the month.

The first cold wave of the month followed a storm of snow, sleet, and freezing rain on the 3d and 4th. Iowa was hardest hit as 1 to 1½ inches of ice damaged power and communication lines to the extent of $300,000. A tornado struck Navy Point, a suburb of Pensacola, Fla., on the 15th, causing $40,000 damage and injuring 1 person.

A severe storm accompanied by high winds and heavy rain and snow was moving across the central portion of the country the last day of the month. Associated with it was a disastrous tornado which struck in a path 45 miles long through four parishes of northwestern Louisiana and was most severe in Cotton Valley. Tabulations for the tornado listed 18 people killed, 220 injured, and estimated damage of $1,500,000.

TABLE 1.—*Monthly and annual temperature departures from normal for the year 1947*

State	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Alabama	+4.6	−6.1	−5.8	+2.5	−0.9	−0.9	−2.6	+1.4	+1.2	+5.4	−1.2	+1.4	−0.1
Arizona	−1.4	+3.5	+1.6	−0.1	+3.4	−1.2	+1.6	−0.6	+3.4	+1.4	−4.5	−2.7	+0.3
Arkansas	+1.3	−6.4	−7.5	+0.3	−1.6	−0.4	−2.2	+4.3	+1.7	+5.4	−3.6	+1.4	−0.6
California	−1.7	+2.1	+1.8	+1.8	+3.6	−0.7	−2.0	−1.8	+2.3	−0.3	−3.8	−1.9	−0.1
Colorado	−0.8	+1.3	−0.6	−0.8	+1.5	−2.9	+0.7	+1.2	+3.9	+4.1	−4.7	−0.4	+0.2
Florida	+7.4	−6.1	−4.1	+4.4	+0.8	−0.1	−1.5	−0.1	−0.2	+1.7	+1.9	+2.1	+0.4
Georgia	+4.3	−5.9	−7.3	+2.9	−0.9	−1.5	−2.8	0.0	+0.4	+3.2	−2.3	+0.3	−0.8
Idaho	−3.8	+4.2	+4.1	+0.1	+4.1	−3.0	+0.6	−0.9	+0.6	+2.5	−3.0	+1.7	+0.6
Illinois	+4.4	−5.2	−6.2	−0.4	−3.3	−2.4	−3.4	+7.3	+0.4	+7.7	−4.5	+2.7	−0.2
Indiana	+4.7	−6.4	−7.1	+0.1	−3.2	−2.6	−4.4	+6.1	+0.4	+7.3	−3.8	+0.4	−0.7
Iowa	+6.1	−4.5	−3.9	−2.0	−4.9	−3.4	−2.2	+7.9	+3.2	+9.0	−4.9	+2.2	+0.2
Kansas	+2.8	−1.9	−4.5	−2.3	−2.9	−2.0	−1.6	+5.2	+4.2	+8.3	−3.7	+1.2	+0.2
Kentucky	+4.5	−8.2	−7.8	+1.7	−3.0	−1.8	−5.4	+3.7	−0.3	+5.8	−2.3	0.0	−1.0
Louisiana	−0.6	−7.3	−6.5	+1.2	−0.1	+0.5	−0.7	+1.4	+1.3	+4.8	−1.7	+0.1	0.0
Maryland-Delaware	+6.5	−3.6	−5.5	+2.3	−0.2	−1.3	−1.9	+2.8	+0.2	+5.5	−1.8	−0.5	+0.2
Michigan	+2.9	−1.6	−2.8	−2.2	−4.6	−2.7	−1.5	+6.8	+1.3	+8.8	−2.7	−0.1	+0.2
Minnesota	+7.1	−2.4	−1.9	−3.8	−4.6	−3.5	+0.2	+6.0	0.0	+8.7	−5.2	−1.7	−0.1
Mississippi	+1.3	−7.4	−6.9	+1.1	−1.1	−0.4	−2.5	+2.1	+1.4	+5.1	−2.0	+0.3	−0.1
Missouri	+4.0	−4.5	−6.7	−0.1	−2.1	−1.0	−3.0	+6.8	+2.6	+7.2	−3.4	+3.5	+0.2
Montana	+1.6	+0.3	−1.7	−0.1	+1.1	−3.2	+1.9	+0.4	−0.1	+3.9	−3.6	+2.9	+0.3
Nebraska	+5.2	−2.1	−2.7	−2.4	−2.5	−3.8	−1.2	+6.0	+2.7	+7.7	−4.3	+1.5	+0.3
Nevada	−0.3	+7.1	+4.2	+1.6	+5.9	−1.1	−0.6	−0.5	+3.6	+2.4	−4.0	+0.2	+1.5
New England	+2.4	+0.7	−0.3	−1.4	−1.4	−1.9	+2.1	+3.2	+0.6	+6.0	−2.1	−3.1	+0.4
New Jersey	+5.9	−2.5	−2.9	+0.7	−0.5	−1.5	−0.1	+2.7	+1.1	+5.7	−1.9	−1.6	+0.4
New Mexico	−2.7	+1.1	−0.6	−1.2	+2.0	−0.1	+1.9	+0.3	+2.6	+3.5	−4.3	−1.5	0.0
New York	+4.3	−1.9	−2.1	−0.7	−1.1	−1.9	+0.1	+4.7	+1.1	+6.9	−2.3	−2.4	+0.4
North Carolina	+5.2	−6.4	−7.6	+2.9	+0.3	+1.3	−3.0	+1.3	+0.3	+3.7	−2.2	−0.8	−0.6
North Dakota	+9.0	−1.1	−1.7	−1.7	−3.5	−3.2	+1.4	+4.3	−1.2	+7.0	−4.1	+0.8	+0.5
Ohio	+5.9	−6.3	−5.9	+0.9	−2.7	−1.9	−4.2	+5.6	+0.5	+7.5	−2.3	0.0	−0.2
Oklahoma	+0.4	−3.5	−5.5	−1.4	−1.8	+0.2	−1.6	+3.5	+3.1	+6.9	−3.8	+1.5	−0.1
Oregon	−2.4	+4.3	+2.9	+1.1	+4.4	−2.6	−1.7	−2.2	+1.4	+1.2	−1.2	+1.1	+0.5
Pennsylvania	+5.3	−5.1	−5.9	+0.5	−2.0	−2.1	−2.6	+3.7	0.0	+5.9	−3.0	−1.0	−0.5
South Carolina	+4.2	−6.2	−7.9	+3.0	+0.1	−1.5	−3.2	+0.1	+0.3	+3.3	−2.7	−0.6	−0.9
South Dakota	+7.4	−1.9	−3.3	−2.8	−2.8	−3.7	−0.1	+6.0	+1.2	+7.4	−5.8	+1.2	+0.2
Tennessee	+4.1	−8.5	−8.4	+1.9	−2.2	−0.8	−4.0	+3.7	+1.2	+6.0	−1.7	+0.4	−0.7
Texas	−2.6	−5.8	−5.4	−0.6	−0.4	+0.8	+0.3	+0.2	+1.4	+5.7	−3.0	+1.2	−0.7
Utah	−3.3	+4.9	+3.2	−0.9	+3.8	−3.6	0.0	−0.4	+2.2	+3.2	−5.3	−0.5	+0.3
Virginia	+5.7	−6.2	−8.1	+1.9	0.0	−1.7	−2.9	+2.3	0.0	+4.4	−1.3	−1.1	−0.6
Washington	−2.0	+3.6	+2.7	+1.3	+4.4	−0.8	−0.8	−1.8	+0.9	0.0	−0.1	+2.0	+0.8
West Virginia	+6.3	−7.8	−8.3	+3.8	−1.6	−1.5	−3.9	+4.0	+0.3	+5.8	−1.3	−0.7	−0.4
Wisconsin	+5.4	−1.9	−1.8	−2.2	−4.5	−3.0	−0.9	+7.2	+1.5	+9.3	−4.4	+0.5	+0.4
Wyoming	+0.6	+0.7	+0.5	−0.3	+2.1	−3.7	+1.9	+2.6	+3.0	+5.9	−5.8	+2.1	+0.8

TABLE 2.—*Percentage of normal precipitation, 1947*

State	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Alabama	208	38	124	147	150	111	62	77	78	62	252	90	114
Arizona	27	22	12	6	209	32	45	133	53	124	92	98	69
Arkansas	55	22	61	114	109	95	34	62	97	117	131	99	84
California	21	44	87	40	49	234	138	170	23	229	36	38	57
Colorado	78	86	73	86	150	184	83	121	79	156	92	101	110
Florida	91	116	209	172	121	128	109	101	155	165	264	101	137
Georgia	172	33	137	135	124	118	52	95	93	169	297	124	119
Idaho	75	60	97	82	84	189	28	97	141	182	105	71	101
Illinois	96	10	77	177	104	157	59	65	96	119	91	101	102
Indiana	128	14	58	193	126	132	94	103	120	84	65	61	102
Iowa	134	29	78	186	104	221	47	41	55	161	115	123	111
Kansas	83	33	167	172	118	129	62	58	49	65	92	229	102
Kentucky	139	16	50	122	142	111	92	105	105	84	83	45	92
Louisiana	168	46	170	146	111	97	33	67	102	57	238	125	112
Maryland-Delaware	119	55	47	81	150	121	98	73	81	50	206	53	94
Michigan	109	83	82	203	148	94	99	91	140	40	95	84	108
Minnesota	73	49	56	160	73	127	57	111	100	88	197	73	100
Mississippi	190	34	104	161	124	110	44	65	113	74	206	88	109
Missouri	57	12	87	166	91	171	62	48	95	129	98	84	98
Montana	84	96	98	88	47	152	60	182	135	122	121	72	106
Nebraska	110	33	55	115	86	219	59	37	83	82	196	218	103
Nevada	22	43	32	82	120	77	10	59	46	102	99	81	64
New England	95	81	89	107	141	127	128	56	73	39	144	76	96
New Jersey	102	57	71	120	199	97	92	81	71	57	202	81	101
New Mexico	86	36	51	47	145	48	54	121	28	61	105	127	76
New York	135	62	107	135	178	130	149	66	80	60	140	82	110
North Carolina	165	32	84	96	67	104	83	89	140	165	229	58	103
North Dakota	74	87	43	104	49	165	74	128	92	130	172	89	106
Ohio	159	24	49	165	154	140	100	130	115	66	84	60	108
Oklahoma	51	13	70	193	143	94	72	40	64	64	103	135	95
Oregon	75	55	111	93	49	246	238	95	73	269	83	66	98
Pennsylvania	117	50	65	113	159	97	145	93	69	41	146	49	98
South Carolina	141	20	131	134	87	97	91	99	116	156	308	126	116
South Dakota	96	52	57	111	44	172	42	49	76	15	268	33	93
Tennessee	169	36	59	95	125	86	79	78	64	96	122	57	89
Texas	142	33	119	78	136	73	37	128	40	47	126	121	89
Utah	78	64	65	134	136	329	39	204	89	152	159	127	124
Virginia	154	52	66	76	90	105	84	92	133	100	187	41	96
Washington	107	87	72	102	30	181	167	57	110	246	84	88	106
West Virginia	129	53	58	60	89	85	97	114	119	52	110	42	85
Wisconsin	98	27	67	155	107	108	80	108	101	66	116	78	98
Wyoming	79	84	79	101	116	239	75	102	98	110	154	72	117

TABLE 3.—*Monthly and annual precipitation (inches), 1947*

State	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Alabama	10.07	1.98	7.13	6.82	5.93	4.70	3.48	3.68	2.61	1.80	8.09	4.77	61.06
Arizona	0.35	0.28	0.13	0.04	0.67	0.11	0.94	3.12	0.71	1.08	0.88	1.26	9.57
Arkansas	2.33	0.78	2.69	5.74	5.50	3.88	1.25	2.20	3.28	3.72	5.06	4.17	40.60
California	0.98	2.01	3.21	0.67	0.46	0.75	0.11	0.17	0.10	2.89	0.88	1.50	13.73
Colorado	0.62	0.83	0.97	1.55	2.85	2.63	1.75	2.38	1.07	1.89	0.72	0.89	18.15
Florida	2.51	3.56	6.84	5.05	4.80	8.75	8.11	7.08	10.48	6.88	5.84	2.80	72.70
Georgia	7.44	1.60	6.87	5.22	4.29	5.22	2.97	4.95	3.37	4.53	7.92	5.30	59.68
Idaho	1.60	1.04	1.72	1.17	1.40	2.67	0.18	0.61	1.52	2.78	2.21	1.46	18.36
Illinois	2.21	0.19	2.45	6.42	4.32	6.31	1.88	2.21	3.53	3.13	2.40	2.13	37.18
Indiana	3.80	0.34	2.17	7.03	5.17	5.21	3.12	3.44	3.98	2.30	1.98	1.66	40.20
Iowa	1.46	0.31	1.38	5.06	4.26	10.40	1.72	1.49	2.10	3.75	1.84	1.46	35.23
Kansas	0.58	0.32	2.47	4.67	4.50	5.20	1.91	1.84	1.40	1.29	1.17	2.08	27.43
Kentucky	6.04	0.54	2.36	4.84	5.66	4.74	3.82	3.89	3.04	2.20	2.82	1.79	41.74
Louisiana	8.53	2.07	8.30	6.86	5.28	4.61	2.02	3.45	4.14	1.83	9.58	6.66	63.33
Maryland-Delaware	3.95	1.61	1.70	2.81	5.38	4.39	4.29	3.26	3.01	1.52	5.43	1.66	39.01
Michigan	2.13	1.41	1.71	4.85	4.91	2.95	2.68	2.52	4.48	1.08	2.41	1.71	32.84
Minnesota	0.54	0.37	0.68	3.40	2.37	5.28	1.85	3.66	2.87	1.61	2.33	0.55	25.51
Mississippi	9.78	1.63	6.08	7.89	5.37	4.63	2.21	2.68	3.48	1.80	7.72	4.62	57.94
Missouri	1.30	0.26	2.80	6.78	4.38	8.19	2.17	1.81	3.83	3.83	2.65	1.82	39.82
Montana	0.76	0.72	0.96	0.99	0.97	3.95	0.81	1.98	1.88	1.33	1.26	0.68	16.29
Nebraska	0.58	0.23	0.61	2.76	2.91	8.19	1.81	0.98	1.71	1.19	1.51	0.87	23.35
Nevada	0.26	0.46	0.32	0.65	1.02	0.40	0.04	0.29	0.19	0.66	0.69	0.79	5.77
New England	3.24	2.48	3.23	3.57	4.85	4.50	4.84	2.10	2.77	1.36	5.12	2.52	40.58
New Jersey	3.71	1.97	2.71	4.33	7.22	3.71	4.27	3.83	2.68	2.06	6.57	2.85	45.91
New Mexico	0.51	0.25	0.38	0.42	1.77	0.59	1.31	2.98	0.48	0.71	0.67	0.90	10.97
New York	3.89	1.63	3.27	4.08	6.33	4.76	5.90	2.42	2.80	1.34	4.28	2.39	43.09
North Carolina	2.44	2.70	0.68	0.14	1.31	0.20	1.01	0.60	1.61	2.03	3.47	1.60	17.79
North Dakota	0.35	0.40	0.34	1.48	1.11	5.81	1.79	2.67	1.45	1.31	1.05	0.42	18.18
Ohio	4.74	0.62	1.68	5.31	5.82	5.55	3.79	4.39	3.37	1.67	2.27	1.61	40.82
Oklahoma	0.73	0.19	1.53	6.87	6.83	3.71	1.99	1.17	2.04	1.90	2.12	2.33	31.41
Oregon	2.83	1.75	3.04	1.84	0.86	3.27	1.00	0.40	0.86	5.38	3.11	2.55	26.89
Pennsylvania	3.65	1.39	2.27	3.86	6.36	4.04	6.23	3.85	2.35	1.34	4.22	1.50	41.06
South Carolina	5.06	0.84	5.26	4.38	3.03	4.54	5.37	5.62	4.76	4.53	7.35	4.56	55.30
South Dakota	0.53	0.29	0.64	2.29	1.25	6.24	1.00	1.03	1.18	1.83	1.74	0.17	18.19
Tennessee	8.21	1.60	3.15	4.17	5.18	3.56	3.54	3.12	1.96	2.70	4.38	2.55	44.12
Texas	2.57	0.58	2.37	2.28	5.05	2.17	0.98	3.04	1.11	1.24	2.68	2.81	26.88
Utah	0.95	0.82	0.93	1.68	1.64	2.30	0.35	2.18	0.90	1.83	1.61	1.44	16.63
Virginia	5.04	1.59	2.39	2.47	3.34	4.36	3.93	4.05	4.31	2.97	4.60	1.25	40.30
Washington	5.02	3.18	2.43	2.51	0.59	3.01	1.10	0.47	1.87	7.39	3.71	4.99	36.27
West Virginia	4.59	1.64	2.27	2.11	3.57	3.80	4.46	4.65	3.52	1.48	3.03	1.36	36.48
Wisconsin	1.22	0.32	1.17	3.91	3.93	4.55	2.73	3.63	3.75	1.57	2.21	1.00	29.99
Wyoming	0.62	0.65	0.90	1.63	2.42	4.21	0.98	1.07	1.14	1.21	1.36	0.51	16.70

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Annual Temperature Departures (°F.) in the United States, 1947

Percentage of Normal Annual Precipitation in the United States, 1947